

SURPLUS sidelights SURPLUS

BY GORDON ELIOT WHITE*

WHAT is made by Collins Radio Co., has a quantity of sand in it, and is used in aircraft? My surplus "find" this month fits that interesting description, for it is an F-1039A/U digitally tuneable bandpass filter covering 2.000 to 29.999 MHz.

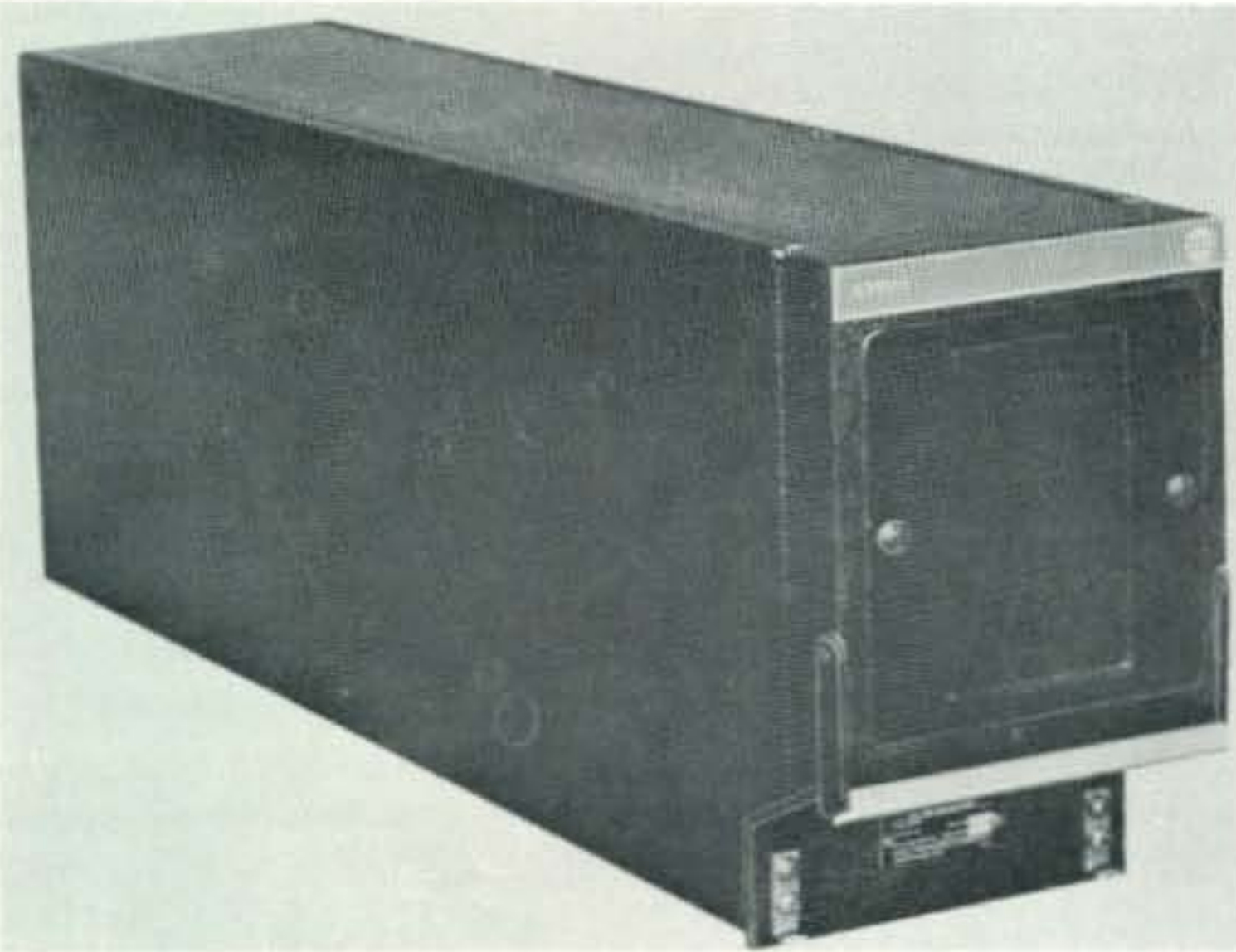
The sand is a "heat sink" in a servo-amplifier module. This was a jolt to me, after hearing for years that sand was to be kept *out* of delicate electro-mechanical equipment. Collins, however, seals the sand in the module with threaded caps on each end of the two-inch tubing container, and the threads are sealed with Silastic 731 RTV sealant. Ap-

parently the relatively dense sand conducts heat better than potting compound, or Collins was providing a "potting" substance which could be removed to allow maintenance of the components. That is a thoughtful thing, since most potted components are throw-aways if one resistor goes bad. It is almost impossible to take the solid potting material off the individual components without destroying them.

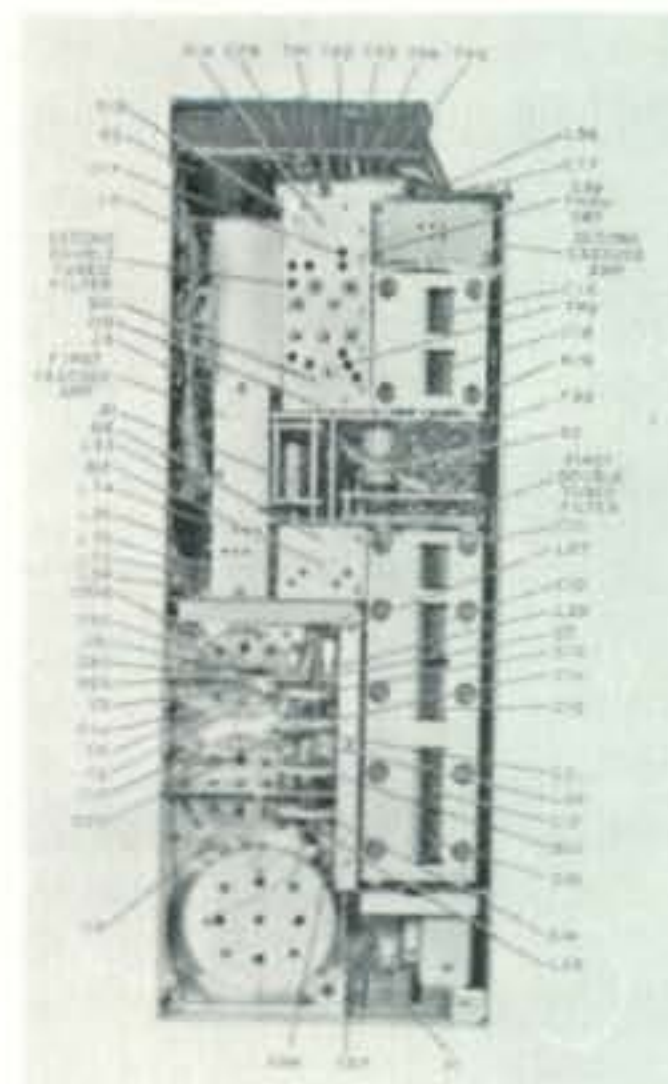
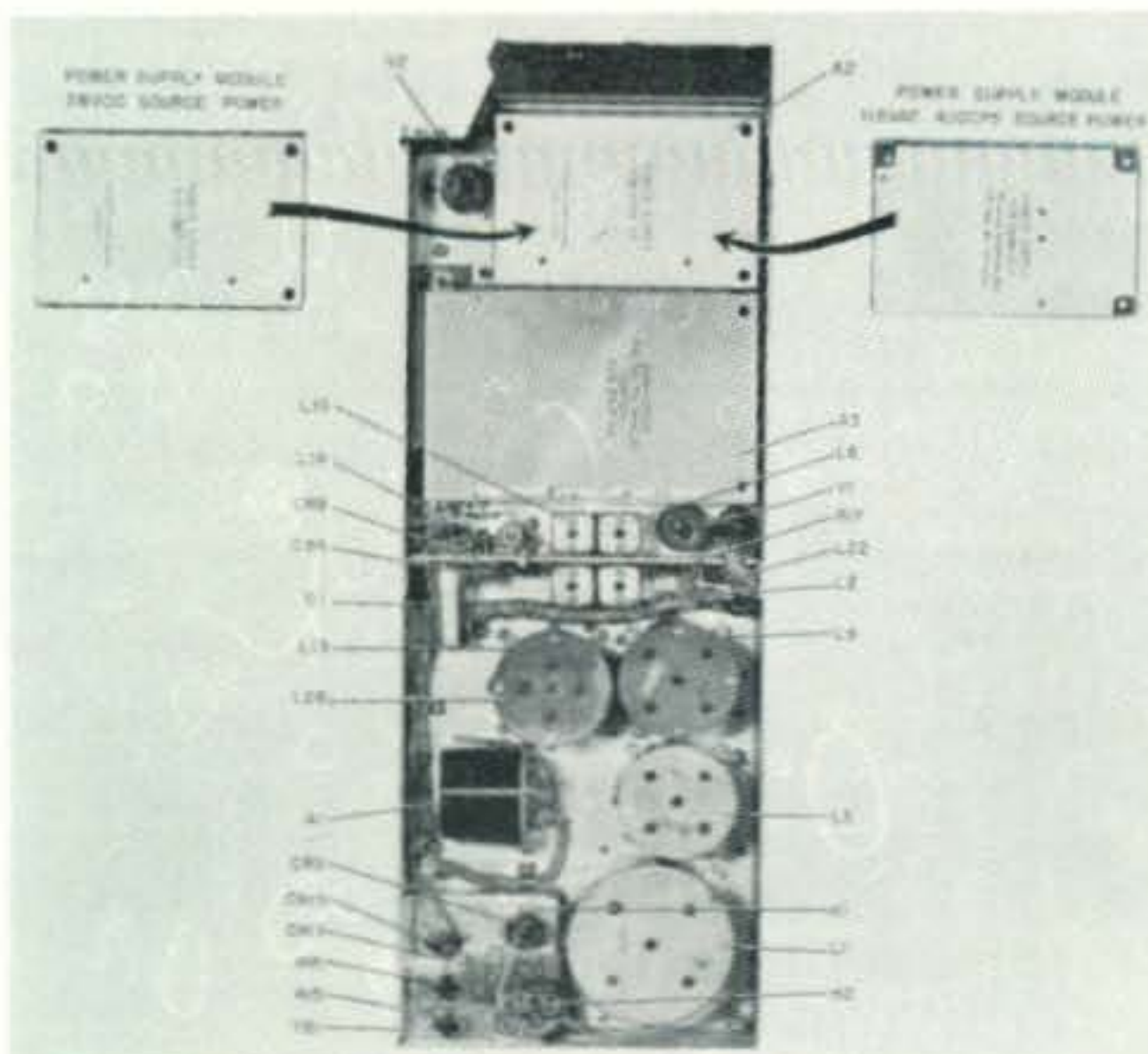
The F-1039A is airborne gear which was probably used on an air command post for the Strategic Air Command, where there were all sorts of circuits in constant-occasionally conflicting-use. Its function was to allow a receiver to operate adjacent to a high-powered transmitter, as close as ten percent in frequency, with a power of 1,400 volts r.f.

Known also by civilian nomenclature of 635V-1 the unit is remotely controlled, and contains a "sharply selective bandpass filter with integral linear radio frequency amplifiers." It can receive and amplify extremely weak r.f. signals, despite the presence of nearby transmitters. It eliminates cross-

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The F-1039A (635V-1) Bandpass Filter is shown on top. The right-side view is shown on the bottom right with the cover removed and the left-side view with the cover removed is shown on the bottom left.



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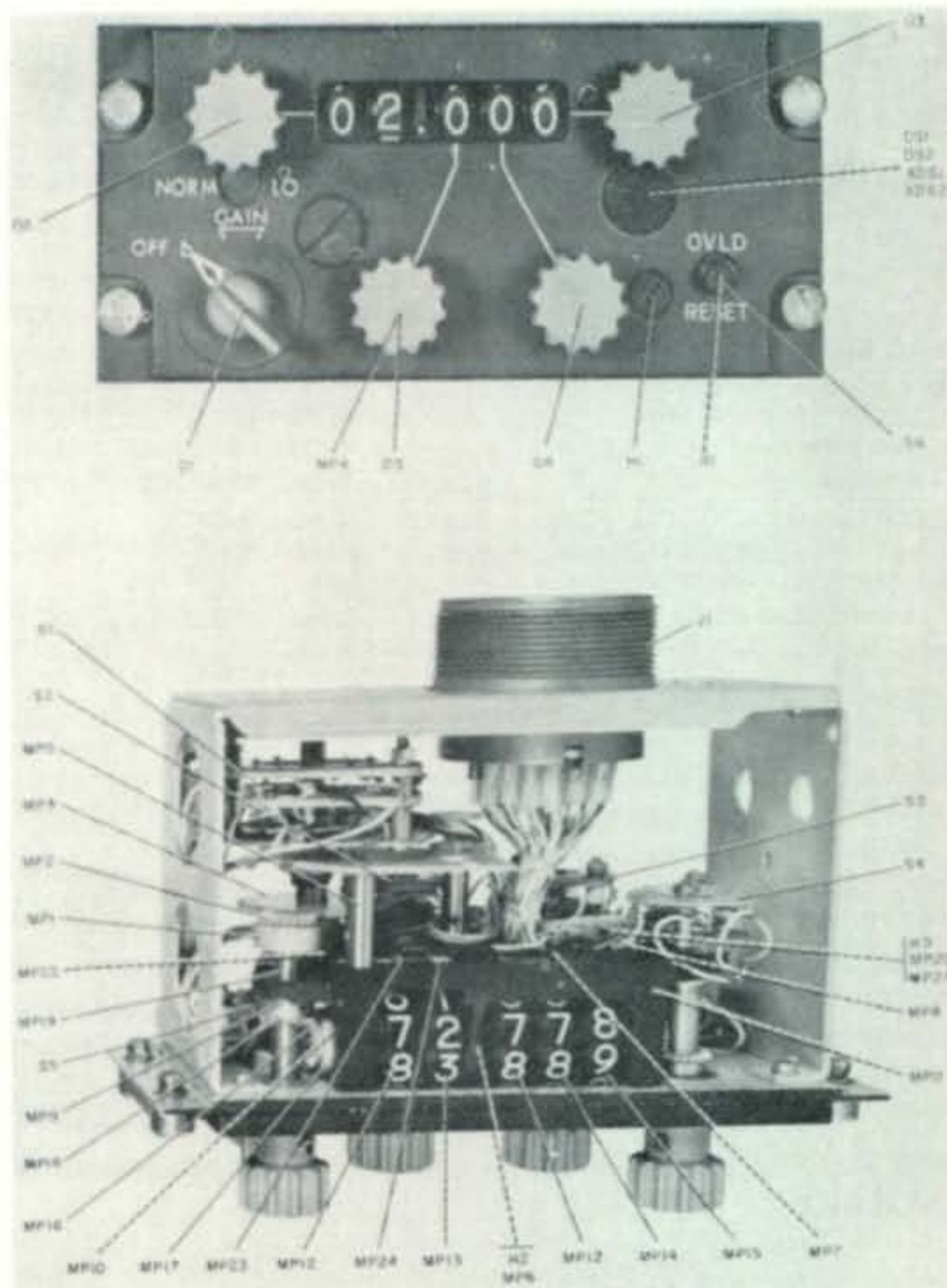
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Exterior and interior views of the 914B-3 remote control head used to digitally tune the filter unit.

modulation and intermodulation, and provides protection against r.f. overloads to itself and its associated receiver.

The filter was designed to be used with the Collins 618T single sideband aircraft receiver which covers the same tuning range.

The remote control, digitally tuned, with level controls, and a reset button for the r.f.-protection circuit breaker is shown in the photo.

This goodie incidentally, is available from ANCOM Electronics, in Hawthorne, California.

Amateur applications of the filter might include both elimination of noise and hash in the high-frequency bands in electrically noisy locations, protection of receivers when their antennas were mounted on buildings near other transmitting stations including broadcast stations, use in a repeater operation, or simply use as a pre-amplifier, as the unit has a sensitivity rated at 0.25 microvolt input at 2 mHz for 10 db signal plus noise to noise ratio in a 2.7 kHz bandwidth. This should hop up most amateur receivers. Even at 29.999 mHz the sensitivity falls off only to 0.6 micro volt for the same S/N ratio.

Gain in the "normal" setting of the control is between 6 and 18 db. (The "low" position reduces gain 35 db) Input and output im-

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and many, many more.....

This is a book literally loaded with schematics for all the currently popular pieces of surplus gear. Most amateurs are well aware of the problems encountered in purchasing seemingly inexpensive surplus units, only to find that no schematic diagram is available.

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pedances are 50 ohms, unbalanced (coax fittings).

The unit comes supplied with one of three power supplies, usable on 28 volts d.c., 115 volts a.c., 400 Hz, or 115 volts a.c. 50 to 400 Hz. Fortunately the one I had to work with had the 50-400 Hz power unit (Collins part number 528 0644 001.) This made the "conversion" a snap—just finding the proper plugs and hooking it up.

Other specs on the unit are: weight 24 pounds, size 5 x 20 x 7½ inches (fits ½ ATR aircraft rack).

The NavShips manual is 0967-120-9012, and there is a Collins, manual on the civilian 635-V version, which is identical.

R.f. input is fed to a double-tuned capacitor/inductor circuit, amplified, and again filtered in a second tuned circuit before being fed to a final r.f. amplifier and thence to the receiver. The circuit uses three type 5687 nine-pin miniature twin triodes in cascode amplifier configuration. According to Collins' the circuit gives "exceptionally linear low-noise amplification."

The second tuned circuit filter section is of lower "Q" than the first because it is loaded with "Swamping" resistors (R₂₇, R₂₈, R₂₉, R₃₅).

Reader John Hutchings suggests it might be possible to sharpen the response by removing the swamping resistors (82K, 47K, 10K, and 10K) in the second section. This is located in a small (5 x 2 x 2½") aluminum box at the front of the left side of the unit. Getting at the resistors looks difficult. This modification *has not actually been tried*.

Most of the real complexity of the F-1039A is in its tuning circuits. It is remotely digitally tuned, and that necessitates digital-to-analog conversion, servo systems, and all that kind of nice stuff. This is accomplished by the familiar servo loop, with error voltages, servo amplifiers, and feedback to achieve zero error voltage when the set is properly tuned.

The power supply, whatever its input voltage, contains a rectifier bridge and a 400 Hz power oscillator which feeds a transformer tapped appropriately to provide the necessary working voltages which are then rectified, filtered, and regulated.

To protect the unit and the receiver, there is an overload relay, K₁, which opens during bandswitching, and whenever high r.f. voltages may be present on the antenna. ■